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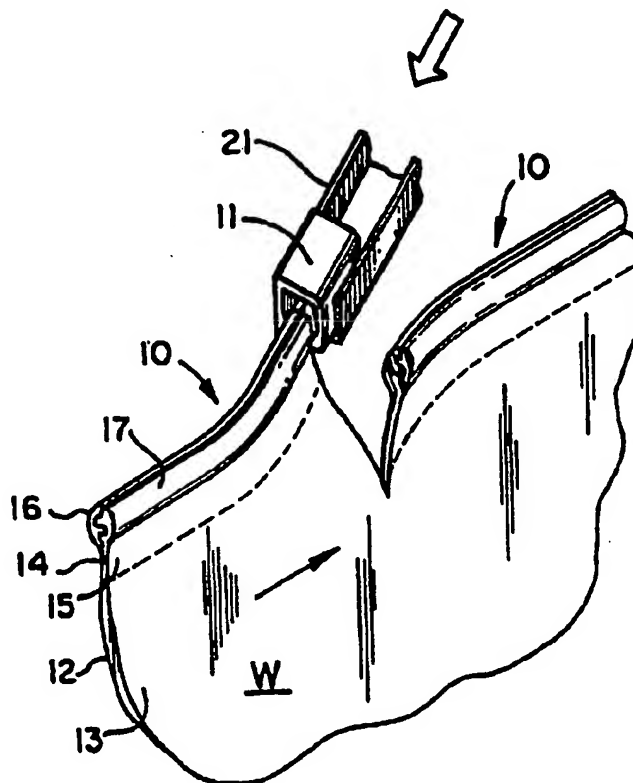
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(54) Title: **PROCESS AND APPARATUS FOR MAKING A PLASTIC BAG WITH A ZIPPER**

(57) Abstract

In a continuous bag-making process, the film (12, 13) and zipper track (10) move intermittently through a bag machine in a continuous stream, so there is no end to the zipper track on which the slider can be inserted. In the present invention, in the intermittent motion-part of the bag machine, the zipper is cut apart at the location that is to be the edge of the bag, the ends formed by the cutter moved laterally relative to each other exposing the ends and the slide (11) is inserted over one of the exposed ends.



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Process and Apparatus for making a Plastic Bag with a Zipper

The present invention relates to a process and apparatus for making a plastic bag with a zipper.

5 Plastic reclosable fasteners in the form of zippers with sliders are well known in the art. The plastic zippers generally have profiles and include a pair of male and female fastener elements in the form of reclosable interlocking rib and groove elements; the slider rides on the zipper for opening and
10 closing the rib and groove elements. The slider is usually of U-shaped configuration having inwardly extending shoulders at the open end of the U to maintain the slider on the zipper as the slider is moved from one end to the other of the zipper.

In the manufacture of thermoplastic film bags, a pair of
15 the male and female fastener elements extend along the mouth of the bags and these are adapted to be secured in any suitable manner to the flexible walls of the thermoplastic film bags. These elements may be integral marginal portions of such walls or they may be extruded separately and thereafter attached to
20 the walls along the mouth of the bag.

For reasons of economy, it is desirable to make the zippered plastic bags by a continuous bag making process. In such process a continuous web of plastic bag material having a plastic zipper profile attached to one edge thereof is moved
25 along a predetermined path. The movement of the zipper and web bag material is periodically interrupted to assemble the slider with the zipper by a relative transverse manoeuvre and to concurrently form a side seal across the thermoplastic sheets between adjacent bags and to sever the completed bag from the
30 end of the continuous web of plastic bag material. At the same time end stops at the ends of the zipper may be formed to prevent the slider from going off past the end of the zipper and coming off of the bag. Examples of this are disclosed in US-A-5131121 US-A-5161286.

35 The slider may be assembled with the zipper by a transverse movement, and may be of the flexible plastic one-piece type as disclosed in US-A-3426396. However, preferably the slider is of

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the foldable plastic type, examples of which are disclosed in US-A-5010627, US-A-5063644, US-A-5067208 and US-A-5070583.

While the slider has heretofore been assembled endwise with the zipper, this method of assembly does not lend itself to a
5 continuous bag making process. It would be desirable to utilize an endwise assembly of a slider on a zipper in a continuous bag making process and thus permit the use of a relatively strong plastic one-piece slider which is structurally stronger than one that has to be assembled transversely on the bag line.

10 The present invention provides a continuous process and system for making zippered plastic bags wherein the zipper slider is inserted onto a continuous zipper track by cutting the track, moving adjacent parts of the track apart, and inserting the slider over one exposed end.

15 According to one aspect of the present invention there is provided a continuous process for making zippered plastic bags, comprising the steps of moving a continuous web of plastic bag material along a predetermined path, said bag material having a plastic zipper profile attached to one edge thereof; severing
20 the zipper at a station along the path to produce adjacent cut ends in the zipper; moving the cut ends of the zipper laterally relative to each other to expose the ends thereof; and inserting a slider over one of the exposed ends, prior to severing the bag material from the remaining continuous web.

25 Advantageously, the movement of the zipper and web of bag material along the path is periodically interrupted, and the zipper is severed while said movement is interrupted.

Preferably, after the slider has been inserted over one of the exposed ends of the zipper, the movement of the zipper and
30 web of bag material is continued for a distance corresponding to a predetermined width of the zippered plastic bag to advance a new section of the zipper to the zipper severing station.

Desirably, the severing is carried out by two knives moving together from opposite sides of the zipper.

35 Advantageously, the lateral movement of the cut ends of the zipper is caused simultaneously with the severing.

Preferably, after the slider has been positioned in the

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zipper, side seals are formed in the web material and end stops are formed on the zipper while the completed bag is being severed from the remaining continuous web of plastic bag material.

5 According to another aspect of the present invention there is provided apparatus for the continuous manufacture of zippered plastic bags from a continuous web of plastic bag material having a plastic zipper profile attached to one edge thereof, said apparatus comprising: means for periodically severing the
10 zipper to produce adjacent cut ends in the zipper; for moving the cut ends of the zipper laterally relative to each other to expose the ends; and means for inserting a slider over one of the exposed ends of the zipper.

Desirably, the severing means comprises a pair of knives.

15 Advantageously, the severing means is the same as the means for moving the cut ends of the zipper.

Reference is now made to the accompanying drawings, in which:

Fig. 1 is a fractional perspective view of a plastic zipper
20 profile attached to one edge of a continuous web of plastic bag material at a station for severing the zipper to produce adjacent cut ends in the zipper;

Fig. 2 is a fractional perspective view similar to Fig. 1 illustrating the severing operation and moving the cut ends of
25 the zipper laterally relative to each other to expose the ends;

Fig. 3 is a fractional perspective view similar to Figs. 1 and 2 illustrating the insertion of a slider over one of the cut ends of the zipper; and

Fig. 4 is a fractional perspective view similar to Figs.
30 1-3 and showing the slider after it has been assembled on the zipper.

In the drawings, there is illustrated a continuous process and system for making zippered plastic bags. The process involves the use of a continuous web of plastic bag material W
35 having a plastic zipper 10 attached to one edge thereof, the zipper 10 being adapted to receive a slider (not shown in Figs. 1 and 2).

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As may be seen in Fig. 1 the web material W comprises a pair of flexible plastic sheets 12 and 13 joined at the bottom (not shown); a pair of flexible plastic strips 14 and 15 extend along the length of the top edge of the bag. The strips 14 and 15 include reclosable interlocking male and female profile elements in the form of rib and groove elements 16 and 17 to form the zipper 10. The strips 14 and 15 may be extruded separately and attached to the respective sides of the bag mouth; or the strips 14 and 15 may be extruded integrally with the sides of the bag mouth.

The rib and groove elements 16, 17 have complementary cross-sectional shapes such that they are closed by pressing the elements together with a slider 11 (see Figs. 3 and 4). The cross-sectional shapes of the interlocking male and female groove elements 16, 17 of the zipper 10 may be of any type: a suitable example is disclosed in US-A-5007143. It is to be understood that the present invention is not limited to the shapes of the rib and groove profiles illustrated herein and that other shapes can be utilized in connection with the present invention. It is also to be understood that the present invention is not limited to the particular construction of the slider 11 disclosed herein and other sliders may be utilized in connection with the present invention.

The flexible plastic sheets 12 and 13 making up the web material W may be made from any suitable thermoplastic film such for example as polyethylene or polypropylene or equivalent material. The slider 11 may be moulded from any suitable plastic such for example as nylon, polypropylene, polystyrene, Delrin or ABS. It is preferable that the slider 11 is moulded in one piece so that it is structurally stronger than a slider that has to be assembled on the bag line.

Referring to Fig. 1, it will be seen that the present invention includes the step of moving the continuous web of plastic material along a predetermined path, as indicated by the longitudinal arrow. A pair of reciprocating knives 19 and 20 are positioned on opposite sides of the path of travel of the web material W. The knives 19 and 20 are adapted to move

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transversely to the path of web travel as indicated by the arrows in Fig. 1.

The movement of the zipper 10 and web of bag material W along the path of travel is periodically interrupted and while the movement is interrupted the knives 19 and 20 sever the zipper 10 at a station along the path to produce adjacent cut ends in the zipper 10. This is best illustrated in Fig. 2. The cut ends of the zipper 10 are moved laterally relative to each other to expose the ends. This can normally be accomplished by the frictional engagement between the cut ends of the zipper 10 and the adjacent side surfaces of the knives 19 and 20. While the cut ends in the zipper 10 are laterally displaced, a slider 11 is fed from a magazine supply 21 of sliders over one of the cut ends of the zipper 10 as illustrated in Fig. 3.

Once the cut ends of the zipper 10 are laterally displaced by the action of the knives 19 and 20, they will normally remain displaced due to the flexible nature of the bag material 12 and 13 in the web W. However, vertically extending retractable fingers may be utilized if necessary to maintain the cut ends of the zipper 10 displaced at the station illustrated in Fig. 3 during the assembly of the slider 11. The slider 11 is moved onto the end of the zipper 10 as shown in Fig. 4 and thereafter the movement of the zipper 10 and web of bag material W continues for a distance corresponding to a predetermined width of the zippered plastic bag to advance a new section of the zipper 10 to the zipper severing station.

After the slider 11 has been positioned on the zipper 10 side seals (not shown) are formed in the web material W and end stops (not shown) are formed on the zipper 10 while the completed bag is being severed from the remaining continuous web of plastic bag material.

In a conventional continuous bag-making process, the film web and zipper track moves intermittently through the bag machine in a continuous stream, so there is no end to the zipper track onto which the slider can be inserted. Under the present invention, during the intermittent motion-part of the bag machine, the zipper is cut apart at the location that is to be

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the edge of the bag, the ends formed by the cutter moved laterally relative to each other exposing the ends, and the slider is inserted over one of the exposed ends. This eliminates the need for installing the slider transversely of
5 the zipper and enables the use of a one-piece slider with no moving parts which is normally structurally stronger than sliders that require assembly as they are placed on the zipper.

While a preferred embodiment of this invention has been illustrated, it is to be understood that other modifications
10 thereof may be made within the scope of the appended claims.

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Claims

1. A continuous process for making zippered plastic bags, comprising the steps of moving a continuous web of plastic bag material along a predetermined path, said bag material having a plastic zipper profile attached to one edge thereof; severing the zipper at a station along the path to produce adjacent cut ends in the zipper; moving the cut ends of the zipper laterally relative to each other to expose the ends thereof; and inserting a slider over one of the exposed ends, prior to severing the bag material from the remaining continuous web.

2. A process according to claim 1, wherein the movement of the zipper and web of bag material along the path is periodically interrupted, and the zipper is severed while said movement is interrupted.

3. A process according to claim 2, wherein, after the slider has been inserted over one of the exposed ends of the zipper, the movement of the zipper and web of bag material is continued for a distance corresponding to a predetermined width of the zippered plastic bag to advance a new section of the zipper to the zipper severing station.

4. A process according to any preceding claim, wherein the severing is carried out by two knives moving together from opposite sides of the zipper.

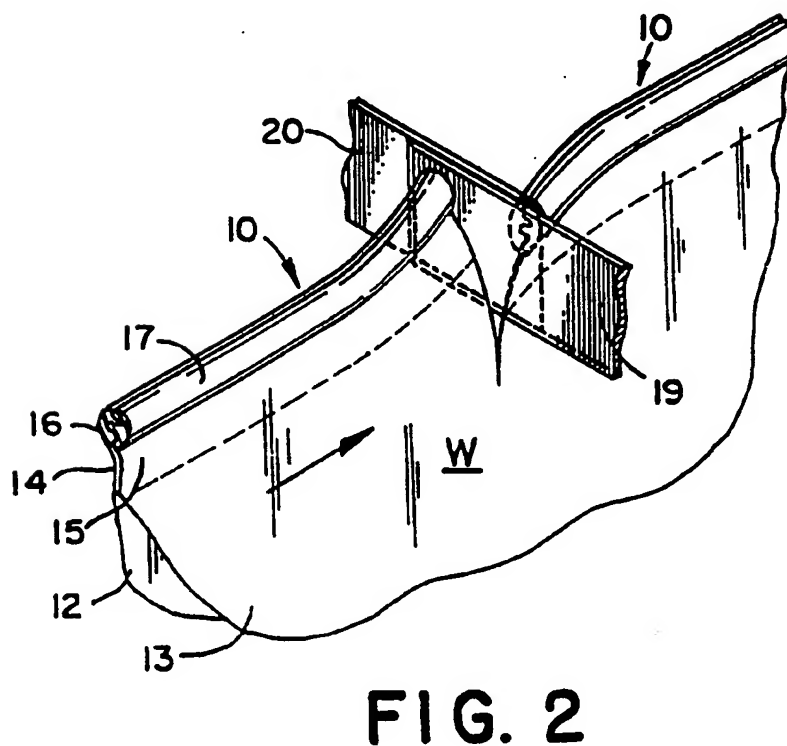
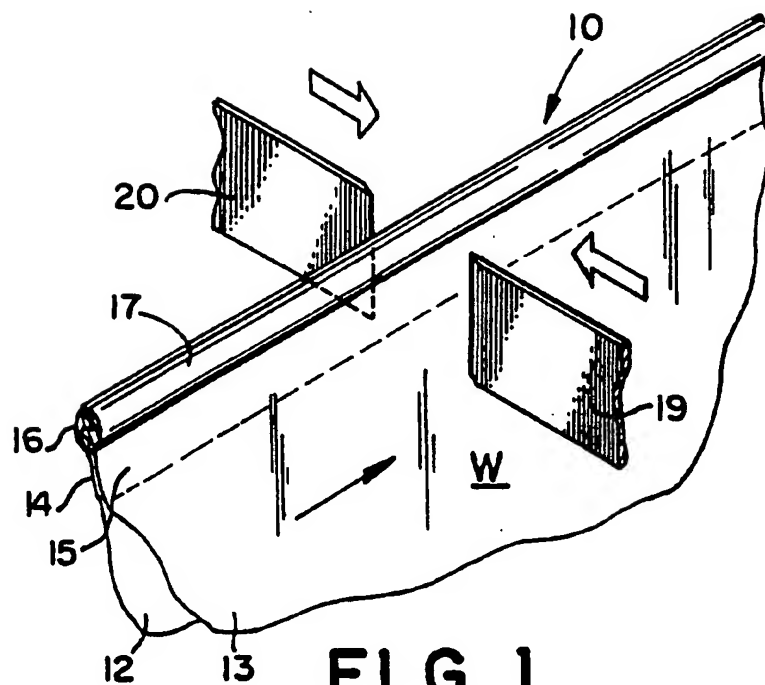
5. A process according to any preceding claim, wherein the lateral movement of the cut ends of the zipper is caused simultaneously with the severing.

6. A process according to any preceding claim, wherein after the slider has been positioned in the zipper, side seals are formed in the web material and end stops are formed on the zipper while the completed bag is being severed from the remaining continuous web of plastic bag material.

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7. Apparatus for the continuous manufacture of zippered plastic bags from a continuous web of plastic bag material having a plastic zipper profile attached to one edge thereof, said apparatus comprising: means for periodically severing the
5 zipper to produce adjacent cut ends in the zipper; for moving the cut ends of the zipper laterally relative to each other to expose the ends; and means for inserting a slider over one of the exposed ends of the zipper.
- 10 8. Apparatus according to claim 7, wherein the severing means comprises a pair of knives.
9. Apparatus according to claim 7 or 8, wherein the severing means is the same as the means for moving the cut ends of the
15 zipper.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/05122

A. CLASSIFICATION OF SUBJECT MATTER IPC(6) :A41H 37/06 US CL :24/399; 156/66 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 24/399, 408, 436; 156/66, 250; 383/64 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 3,202,559 (LAGUERRE) 24 August 1965, column 2, lines 10-20.	1-9
A	US, A, 3,554,822 (SCHWARZKOPF) 12 January 1971, see whole document.	
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